Name:

## at1119paper: Complete the Square, $b$ = odd (v520)

### Example

By completing the square, find both solutions to the given equation:

$$x^2 - 53x = -520$$

Add $\left(\frac{-53}{2}\right)^2$, which equals $\frac{2809}{4}$, to both sides of the equation.

$$x^2 - 53x + \frac{2809}{4} = \frac{729}{4}$$

Factor the left side.

$$\left(x + \frac{-53}{2}\right)^2 = \frac{729}{4}$$

Undo the squaring.

$$\begin{array}{rcl} x + \frac{-53}{2} = \frac{-27}{2} & \text{or} & x + \frac{-53}{2} = \frac{27}{2} \\ x = \frac{53 - 27}{2} & \text{or} & x = \frac{53 + 27}{2} \\ x = 13 & \text{or} & x = 40 \end{array}$$

### Question 1

By completing the square, find both solutions to the given equation:

$$x^2 + 7x = 330$$

$$x^2 + 7x + \frac{49}{4} = \frac{1369}{4}$$

$$\left(x + \frac{7}{2}\right)^2 = \frac{1369}{4}$$

$$\begin{array}{rcl} x + \frac{7}{2} = \frac{-37}{2} & \text{or} & x + \frac{7}{2} = \frac{37}{2} \\ x = \frac{-7 - 37}{2} & \text{or} & x = \frac{-7 + 37}{2} \\ x = -22 & \text{or} & x = 15 \end{array}$$

## Question 2

By completing the square, find both solutions to the given equation:

$$x^2 - 45x = 1656$$

$$x^2 - 45x + \frac{2025}{4} = \frac{8649}{4}$$

$$\left(x + \frac{-45}{2}\right)^2 = \frac{8649}{4}$$

$$x + \frac{-45}{2} = \frac{-93}{2} \quad \text{or} \quad x + \frac{-45}{2} = \frac{93}{2}$$

$$x = \frac{45 - 93}{2} \quad \text{or} \quad x = \frac{45 + 93}{2}$$

$$x = -24 \quad \text{or} \quad x = 69$$

## Question 3

By completing the square, find both solutions to the given equation:

$$x^2 + 55x = 2106$$

$$x^2 + 55x + \frac{3025}{4} = \frac{11449}{4}$$

$$\left(x + \frac{55}{2}\right)^2 = \frac{11449}{4}$$

$$x + \frac{55}{2} = \frac{-107}{2} \quad \text{or} \quad x + \frac{55}{2} = \frac{107}{2}$$

$$x = \frac{-55 - 107}{2} \quad \text{or} \quad x = \frac{-55 + 107}{2}$$

$$x = -81 \quad \text{or} \quad x = 26$$